

Exploring the motivation and challenges for land-users engaged in sustainable grazing in Europe

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ABSTRACT

Grazing of both domestic and wild large herbivores can contribute to multiple ecosystem services. However, grazing systems strongly differ in the intensity of management and outcomes, and we define sustainable grazing as grazing which benefits multiple environmental ecosystem services. Previous studies have found that, in general, grazing systems with relatively low densities of animals, and with minimal and only targeted applications of deworming and other medicinal treatments, are most sustainable. However, for people engaged in such grazing management, a key question is what are their challenges and motivation.

We conducted interviews with 74 land-users, who are engaged in sustainable grazing management, in eight case-study areas in Europe. Employing the capability, opportunity and motivation-behaviour model (COM-B), we identified key motivation factors driving sustainable grazing management and the challenges which these land-users face. We found that capability and opportunity linked to land abandonment and rural exodus impact upon land-users' management, especially in parts of South and Eastern Europe. Furthermore, challenges linked to the environment were particularly important in remote areas. In addition, we found economic aspects to be important in driving land-users' behaviour, especially fiscal measures of the Common Agricultural Policy. Moreover, our results indicate that engagement in sustainable grazing management is often intrinsically motivated by the interest in nature conservation, intergenerational continuity and cohesion in the rural community.

Based on these results, using the Behaviour Change Wheel, we identify key interventions that could facilitate and encourage the capabilities and opportunities to conduct sustainable grazing management. These include incentivising extensification using subsidies, developing direct market possibilities and removing administrative hurdles for practises related to very extensive and semi-wild grazing.

1. Introduction

Grazing by large ungulate herbivores, whether they are wild or domestic, is important in shaping the landscapes of Europe, especially grasslands. While it is crucial for maintaining some key ecosystem services (i.e benefits provided by ecosystems such as habitat for biodiversity and cultural services.), in certain cases, grazing can be harmful to

the environment (Garnett et al., 2017), for example, in the case of intensive grazing practices that lead to overgrazing. Grazing management in Europe has undergone two parallel processes in recent decades. First, there is the intensification of grassland management, characterised by an enhancement of production through increasing input (e.g. fertilisers). It is not only driven by economic pressures, but also due to support through the EU's Common Agricultural Policy (CAP) (Navarro and

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López-Bao, 2019; Pe'er et al., 2020; Scown et al., 2020). This intensification is largely considered environmentally-detrimental (Humbert et al., 2021; Manning et al., 2015; Rouet-Leduc et al., 2021). It negatively affects plant biodiversity (Olf and Ritchie, 1998; Koerner et al., 2018), insect (Takagi and Miyashita, 2014; van Klink et al., 2015) and bird (Rigal et al., 2023) diversity, and is associated with high greenhouse gas emissions and nutrient leaching (Bellarby et al., 2013; Nyström et al., 2019). Second, socioeconomic factors have led to (land) abandonment of many grasslands which were traditionally used as pastures or meadows. This abandonment is characterised by a gradual decrease in agricultural activities, with there sometimes being large areas where agricultural activities have stopped (Moreira et al., 2011). As extensive grazing is integral for maintaining the provision of multiple ecosystem services in the countryside (Ryschawy et al., 2019), maintaining and encouraging it is important. In addition to providing meat and dairy products, grazing has the potential to maintain a habitat for biodiversity (Olf and Ritchie, 1998; van Klink et al., 2015), to reduce wildfire risks and impacts (Rouet-Leduc et al., 2021) and to provide numerous cultural ecosystem services for people (Plieninger et al., 2015). However, this pre-supposes that such grazing is done in an environmentally-sustainable way, for example, through very low-intensity grazing practices, or minimal use of parasiticide medicine (Floate et al., 2005; Verdú et al., 2018). In addition, sustainable management of large herbivores helps to create heterogeneity in the landscape (Fuhlendorf et al., 2006; González-Hernández et al., 2020) and increases biodiversity. We therefore define sustainable grazing as a set of practices (e.g. low-density grazing or rotational grazing, with no or only very limited inputs of external feeds, artificial fertilisers deworming medication; Teague and Kreuter, 2020) that contributes to multiple ecosystem services such as soil health or biodiversity. It also pre-supposes that land-users are equally equipped, willing, and cognizant of requirements to make the shift to extensive grazing and to manage it in a sustainable way. We acknowledge the existence of multiple definitions of sustainability (Thompson, 2007) such as resource sufficiency (Jungell-Michelsson and Heikkurinen, 2022) and regenerative sustainability (Buckton et al., 2023). However, here we choose to identify sustainability as contributing to multiple ecosystem services since it provides a framework to integrate multiple aspects of sustainability while seeing grazing systems as complex socio-ecological systems (DeClerck et al., 2016). While it is clear that sustainable grazing management has multiple benefits, the ongoing land-use trends in Europe - still moving away from it - raise a fundamental question regarding the factors that motivate land-users to manage grazing areas in a sustainable way, and what barriers they experience.

Previous studies looking at land-users' and farmers behaviours conducting sustainable management found that they were influenced by contextual factors, such as financial resources (Kabii and Horwitz, 2006), social environment (Burton, 2004), physical capacity, and infrastructure (Belknap and Saupe, 1988; Dwyer et al., 2007), as well as environmental and biogeographical conditions (Wilson and Hart, 2001). Equally, psychological capacity, which comprises knowledge, and access to information and education (McDowell and Sparks, 1989; Wilson, 1997), may also determine one's ability to implement sustainable grazing management. Beliefs and attitudes are additional important drivers of behaviours (Lynne et al., 1988; Baumgart-Getz et al., 2012) as well as collaboration between different farmers and collaboration with other stakeholders, for example in maintaining grasslands (Couvreur et al., 2019; Petit et al., 2019, 2022). However, we lack a comprehensive understanding of the different factors (interactively) influencing land-users' sustainable grazing management, and how they could be addressed by interventions such as policy changes.

In this study, and against this background, we applied the Behaviour Change Wheel (BCW; Michie et al., 2011; 2014) to further understand the behaviour of land-users who are involved in sustainable grazing management. We then address potential behaviour-change intervention functions to target the identified COM-B factors in the discussion.

According to the COM-B model, behaviours (B) are influenced by

- (i) Capability (C, the psychological and physical ability to engage in the target behaviour)
- (ii) Opportunity (O, aspects of the physical and social environment that enable or hinder the target behaviour), and
- (iii) Motivation (M, the mental processes that activate or inhibit behaviour).

Importantly, capability, opportunity, and motivation do not work in isolation, but interact to influence behaviour. Each COM aspect is further subdivided into two sub-categories, resulting in six COM-B categories (see Supplementary table 1). Original definitions of each COM-B subcategory are in Supplementary table 3, we also included additional definitions and examples relating to sustainable grazing.

Synthesised from 19 different behaviour change models, the BCW is an integrative model of behaviour change, providing a comprehensive and systematic framework for designing behaviour-change interventions (Michie et al., 2011). It does this by linking the factors influencing human behaviour to the development of interventions and policies for promoting behavioural change. The BCW has three layers: at the core is the 'behaviour system' or COM-B model (Capability, Opportunity, Motivation, Behaviour) which represents the key factors that influence any behaviour. The middle contains nine 'intervention functions', which are activities aimed at changing behaviour by targeting the identified COM-B factors. Lastly, the outer layer shows seven 'policy categories' which are possible actions by the responsible authorities that could help support the intervention functions (Michie et al., 2011). Furthermore, the BCW identifies links between the COM-B factors and intervention functions most likely to be appropriate and effective for bringing about the desired change, as well as the policy categories most likely to support these interventions (Michie et al., 2011, 2014). These linkages between the three layers of the BCW are to be used to direct intervention designers to the optimum package of interventions and policies to change the factors that influence behaviour. In this way, the three layers of the BCW are interlinked – specific intervention functions are linked to COM-B factors, and specific policy categories are recommended to target certain intervention functions (see Appendix). The BCW can thereby be used to help:

- 1) Identify key challenges and factors of motivation to the target behaviour via the 'behavioural system'
- 2) Consider potential intervention functions to target these challenges or facilitators, and
- 3) Determine the most appropriate policy areas in which to apply these interventions.

So far, the COM-B has mostly been used for topics related to public health (Alexander et al., 2014; Bentley et al., 2019), and has only recently received attention in nature conservation and land management contexts (e.g. pest management, Kropf et al., 2020 and pollination, Marselle et al., 2021). We apply the COM-B model in this study because engagement in sustainable grazing management involves a complex interaction of all aspects relevant to the COM-B model, such as thought processes, material challenges and opportunities (in the landscape), as well as interpersonal relations and social norms (perceived informal rules within a group or community) in relation to ideas of proper conduct, continuity in the cultural landscape (Prokopy et al., 2019). Together, these also enable an informed discussion about broader change processes and values among land-users in relation to the landscape. We use the COM-B model of the BCW, in this way, not only to map the behaviour factors of land-users, but also as a vehicle to develop recommendations for policy and for driving societal transformations towards sustainability.

2. Methods

2.1. Positionality

The authors are researchers and practitioners located primarily in Europe (Holmes, 2020). We position our work at the intersection of social sciences and nature conservation practice. Authors in the group have a diverse interdisciplinary background in sustainability science, environmental psychology, environmental communication, ecology and biology. The author group also benefited from the close collaboration with practitioners working within the field of nature conservation in an NGO. The work of all authors is transdisciplinary in nature as we all aim to bridge a gap between different disciplines as means to inform policy and practitioners. We seek to shed light on what motivates land-users to conduct sustainable grazing practices and we speak to various audiences including researchers, policymakers, NGOs and land-users.

2.2. Participant selection and recruitment

We conducted this study as part of the EU-funded GrazeLIFE project (<https://grazelife.com>), which aimed to improve implementation possibilities of different grazing models. The GrazeLIFE project had eight case-study areas across Europe (Fig. 1). These were selected from among the network of Rewilding Europe sites as based on covering a wide range of geographic, social and cultural contexts in Europe. The case-study areas cover various types of grazing management, both extensive grazing by domestic, and semi-wild grazing, in rewilding projects, or other traditional systems of animal-rearing (Supplementary table 2). Within the GrazeLIFE project, we conducted 74 face-to-face interviews between September 2019 and March 2021 (the relatively long timespan occurred due to the COVID-19 pandemic). We used a purposive sampling technique and recruited participants in the interviews through stakeholder workshops organised by Rewilding Europe and local partner organisations to Rewilding Europe. The interviews were with farmers, land-owners, animal owners that were grazing them in common lands or managers of a rewilding area where grazing with semi-wild herbivores

was used. They were practising extensive grazing, or what they perceived as sustainable grazing management, either as a sole practice, or alongside other grazing practices (including more intensive practices). We define the participants as ‘land-users’ since they include not only farmers, but also other people, e.g. NGO members, or herders, who are engaged in such activities. We focus on land-users practising sustainable grazing management regardless if they are productive livestock systems or semi-wild grazing systems (i.e. with only very minimal grazer management, i.e. for animal registration and often in unfenced areas) practising conservation grazing through rewilding with large herbivores. We chose to do so rather than to focus solely on productive livestock systems, in order to be able to explore and compare grazing systems that do not depend on a farm but still have the opportunity to provide multiple ecosystem services. These include, e.g., grazing in systems of Commons or with semi-wild herbivores. Considering the wide range of land-users we interviewed in terms of both geographical scope and grazing practices, the scope of this study was not to evaluate whether the practice is sustainable or not - but rather to understand the motivations of people who expressed themselves that they were conducting sustainable grazing. Sustainability being a complex and multi-dimensional concept, considering how land-users perceived their practices was key to identifying what motivates their behaviour. We collected informed consent prior to holding the interviews, by means of a document which explained how the information from the interview would be used and by whom. The participants received no financial compensation. The number of participants interviewed in each case-study area was limited by the human resources available to conduct the interviews in the project. The interview project description, as well as the interview guide and consent form, were approved by the Ethics department of the University of Leipzig in Germany.

2.3. Development of interview guide

For this study, we applied a qualitative interview approach to reach our main research objective. The approach was to collect empirical knowledge on land-users’ grazing management in an open way, to thus

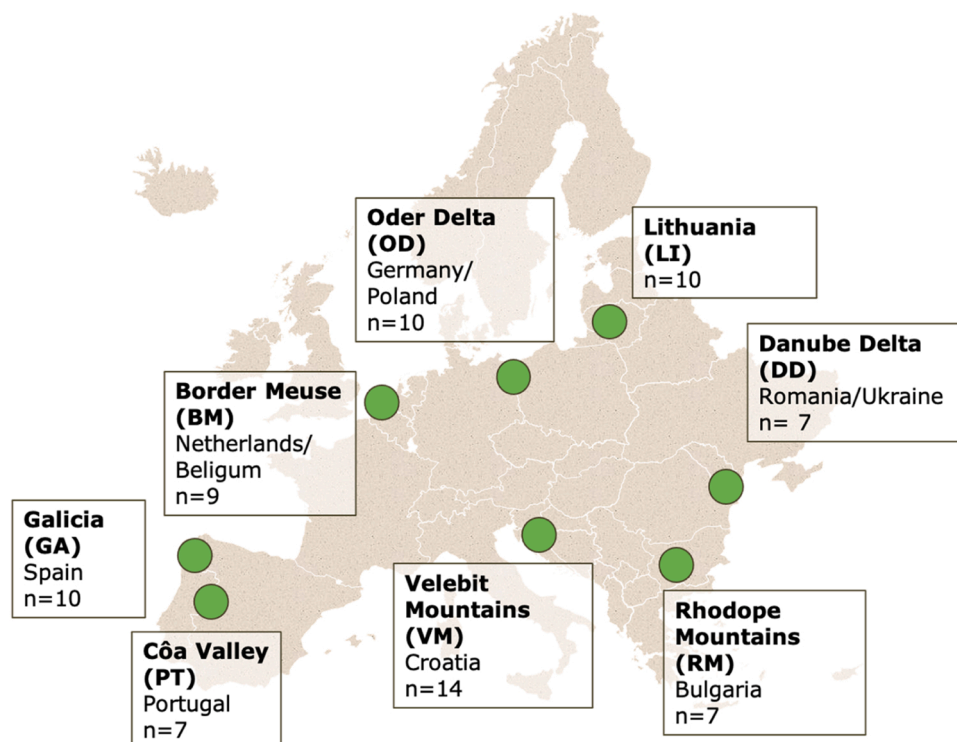


Fig. 1. Overview of the case-study areas, abbreviation and number of participants.

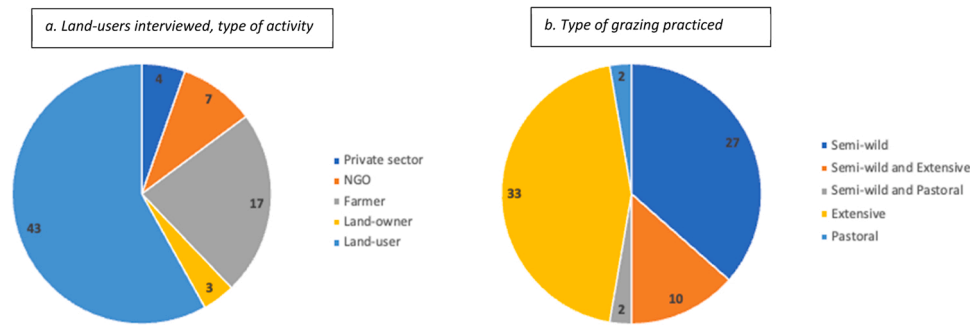


Fig. 2. Number of land-users interviewed, a. how land-users defined themselves or what sector they belong to, nb:“land-user” was used as a general term when they did not define themselves by the other terms, b. type of grazing management they conducted.

gain better understanding of the factors influencing land-users to engage in this management (Flick et al., 2004).

We based our semi-structured interview guide on key questions which emerged from the GrazeLIFE project and previous literature (Rouet-Leduc et al., 2021; Pe'er et al., 2021). The interview guide consisted of four main sections:

- 1) Questions on the participants’ background and the nature of their activities in relation to grazing management
- 2) The challenges of grazing management and potential human-wildlife conflicts and
- 3) Questions regarding factors potentially influencing their behaviour in relation to grazing management and how these were incentivised

We pilot-tested the interview guide with 11 land-users in three countries (Bulgaria, Romania, Spain). Based on this, we revised the interview guide prior to its implementation in all the case-studies to make the questions more concise through reformulation of the questions.

2.4. Data collection

Local partners in each case-study area conducted the interviews. To ensure consistency, only one interviewer conducted all the semi-structured interviews within a case-study region. This also facilitated trust with interviewees and familiarisation with the area. To ensure consistency across interviewers and case-studies, meetings were arranged between the authors and the partners conducting the interviews to practice the interview process and maintain consistency across the different case studies. The authors also had debriefing meetings with the local partners to discuss experiences and challenges as well as to clarify some of the interview transcripts in regards to concepts and translations.

All the interviews were conducted in the participants’ local languages. These interviews were fully recorded, transcribed and translated into English by the local partners who conducted the interviews. The transcriptions were scanned by two authors who contacted the local partners (or the interviewers) in cases where the translation was unclear, or if some concepts relating to local practices needed explaining.

2.5. Analysis

We used an Interpretative Phenomenological Analysis (IPA) to analyse the interviews. The primary objective of IPA is to explore how individuals comprehend their personal and social surroundings. IPA aims to understand the significance that specific experiences, events, or states hold for the participants (Smith et al., 1999). This was relevant to our study as we wanted to explore the participants’ behavioural factors. After an inductive familiarization with the findings (Bingham, 2023; Saldaña, 2013), we clustered preliminary themes in coding stage 1, which reflected land-users’ perception and behaviours in relation to

their land management. In the second-cycle of coding, we linked these themes to the COM-B framework. This helped to organise emergent sub-themes as behavioural influences related to capability, opportunity, and motivation.

This combination of initial coding and identification of emergent sub-themes, using inductive analysis and deductive analysis to group sub-themes into superordinate themes based on theory, gave us a holistic understanding of the issue, whilst still allowing us to structure our findings in the COM-B framework (Bingham, 2023). Some responses could potentially belong to one or more themes, yet to avoid repetition, these were categorised according to only one theme or mentioned briefly in the other categories when they were recurrent themes in the participants’ responses, such as rural exodus or family tradition.

A sample of interview transcripts were coded independently by two different authors using MaxQDA. Initial codes were compared and discussed between them to generate themes which emerged from the data. We thereby ensured the coding system and analysis were rigorous.

3. Findings

Participants’ answers provided us with information on different factors that influence their grazing management and are organised according to the COM-B model (capability, opportunity and motivation). We illustrate categories by examples from the interviews. Among the capability factors, key issues were workforce and demography, availability or lack of infrastructure, accessibility to knowledge and clarity of regulations.

3.1. Physical capability

Participants mentioned challenges in conducting grazing management linked to the lack of human resources and infrastructure. These reflections were often mentioned with a degree of despair, as they linked to the broader processes of a rural exodus. A recurring theme was that the younger generations leave rural areas for more economically-viable urban areas. The topic was particularly dominant among interviewees in case studies situated in Eastern and Southern parts of Europe (PT, DD, RM, GA, VM), as in:

“There are no people who can work, I can create jobs, but there are no people”. (RM_4_LU)

In these same areas, participants also often expressed that their chosen land-use stemmed from a long family tradition, but that new generations are rarely interested in continuing this type of activity. For the few young people who might consider this, there are simply no longer as many traditional farms associated with extensive grazing, as these had given way to larger farms, such as in the Oder Delta. This may have further pushed young people away. The term, ‘abandon’, was used to describe the emigration of these young generations, contrasting them with older ‘stayers’, as in:

“Only the older generation practises grazing, young generations largely abandon the area”. (DD_2_LU)

While such stayers were credited for their loyalty to the landscape, their physical prowess as farmers could not compete with those of young people. Put simply, able young bodies are needed to invigorate the workforce, as much of the labour is manual. However, some participants working specifically in farming suggested that it was the physical nature of this job on the farm that deterred new recruits and contributed to the youth leaving for more comfortable jobs, as in:

“The next generation does not want to farm, because it is too hard, too much work. They usually move abroad and choose easier career options.” (LL_1_LU)

Indeed, activities such as herding animals, and having animals grazing far away from the farm, require substantial labour compared to when animals are kept in a barn (Bernués et al., 2005). In some places such as in the Oder Delta, participants pointed to increased mechanisation and automatization of farming operations as a driver of employment-losses:

“The decline of agriculture and forestry does (nearly) not lead to land abandonment, it leads only to raised efficiency and productivity, resulting in the reduction of jobs.” (OD_3_LU)

This participant confirms a known phenomenon whereby the replacement of manual labour with technology, rather than just making the work less strenuous, eventually leads to a reduction in available jobs (Leal Filho et al., 2017).

3.2. Psychological capability

Lack of knowledge, and access to support and education, is a challenge which some land-users stated they are facing. In some cases, land-users expressed “isolation” and difficulty in accessing knowledge about the conditions and parameters under which they can access subsidies. This was mentioned by a Lithuanian land-user:

“Farmers are still very vulnerable, lacking financial education, living an isolated life, and lacking communication”. (LL_8_LU)

Such isolation, as we surmised from this participant working in farming, was both physical (i.e. being physically remote from other people) and cultural (i.e. lack of knowledge). Knowledge, in this context, was seen as a kind of combined scientific and lay assessments of best practices with regard to output. Clashes in the combination of science and lay knowledge could exacerbate challenges in making the right decisions. However, numerous land-users also mentioned how situated knowledge from their practices gave them expertise in their management, and that the applicability of knowledge from remote experts was questioned on the farm in some cases.

“Veterinary inspectors should get proper training about beef cattle, to learn that they are stronger than dairy cows, that they can graze throughout winter and that the animal welfare does not suffer due to this.” (LI_5_LU)

Land-users also mentioned that valuable knowledge was lacking amongst professionals associated with the industry, which could hinder them from implementing what they perceived as good practices rooted in experiential, situated knowledge. For example, land-users mentioned that veterinary inspectors and organic controllers and their requirements were not necessarily compatible with some practices associated with sustainable grazing, such as refraining from systematic deworming, or having animals outside all-year-round. This was the case for this land-user from the Oder Delta reflecting on the lack of autonomy for land-users to treat the animals how they consider is best for their grazing management:

“We try to use as little medicine as possible, like with deworming. I am a biologist myself and I know that in the past it was typical that all animals were treated with medicine and then they were brought to another pasture. But if you proceed like this, the strongest parasites always stay, so that you create a selection of parasites. But today this has changed, medicines are only applied individually. But our organic farming controller was putting us under pressure. When the veterinarian said that our animals have to be treated with a specific medicine, he gives us medicine for all animals, but of course he agrees that we treat only the ill animals and that we can apply this medicine also later, when we see that another animal is ill. But the organic controller tells us that we are not veterinarians, so that we are not allowed to use this medicine for another animal, if we find that this other animal is ill.” (OD_5_LU)

Disconnection among different knowledge systems also manifests with several land-users speaking about their own deficiencies in navigating the ‘system’. Specifically, this referred to their lacking ‘bureaucracy literacy’ which, in some cases, exacerbated their disadvantage when adopting some practices. This was particularly the case with the CAP’s Cross Compliance and Agri-Environmental Climate Measures which require substantial administrative work. Indeed, one farmer said outright:

“If I had known that the bureaucracy would be so extreme, I maybe would not have started this at all.” (OD_2_LU)

In this way, a lack of knowledge and understanding of policies and regulations is seen as actively limiting the ability for land-users to get support in the form of relevant subsidies.

3.3. Physical opportunity

A key factor for land-users was the legislative framework with which they are confronted at any given time. The CAP was frequently mentioned by participants as having a central impact on their management. In particular, the requirements set by the Habitats’ and Birds’ Directives are often implemented via the CAP, i.e. through Cross Compliance, setting requirements for Good Agricultural and Ecological Conditions, or via Agri-Environmental Climate Measures (AECM). Participants across all case studies mentioned that this aspect of the CAP was a strong driver of their management as it provides guidelines and criteria on how animals, and relevant habitats, need to be managed (see also Pe’er et al., 2021). In many cases, land-users said they do what is necessary to comply with the CAP’s requirements, even when they do not agree with the regulations, for example, regarding the clearing of scrub from pastures.

[We must] “clear them [from scrub, otherwise] we get penalties... as of 300 decares, they count half as ineligible for subsidy because of the bushes, and instead of receiving a subsidy, we have to pay penalties. [...] The requirement to totally clear the pastures from shrubs is bad for us, the animals graze them, but the requirements are much stricter ... However, in the dry period, the animals graze the grass under the bushes ...and, in the winter, also eat the leaves and branches from the bushes. The shrubs are food resources for the animals in the winter when the grass is over, and yet they press us to remove it”. (RM_2_LU)

Even if economic support stemming from the CAP subsidies often represents a significant source of income for participants, they reported that economic considerations are important, regardless of the type of management they conduct. Lack of economic support was a particular challenge for small farms, since direct payments are calculated based on the farmed area and support levels therefore increase with farm-size. This generates a benefit for larger land-owners. Some land-users saw this as an incentive for land concentration where ‘big’ land-owners and farmers take over land from ‘small’ land-owners or farmers. Subsidies were important for land-users since often their activities were not generating enough revenue to cover the costs of their activities because

of the price of the land or the equipment. This aspect was noticeable across all the case studies:

“In the past, the support used to cover the costs, but now some amount was reduced or taken away. The taxes and profit tax increases, so profitability is close to zero. (...) It is very difficult to invest and expand as the cost of the equipment varies, everything goes up, rent goes up, land tax goes up and so on, the support amount doesn't change and there may come a time when you will not pay off to do farming.” (LI_8_LU)

Direct payments also had strong impacts on commons, i.e. land parcels, which are managed, or used, by communities - a problem that was raised in Galicia and the Danube Delta. For some land-users working on commons, economic support from the CAP was not possible, either because they do not fulfil the ‘farmer’ eligibility criteria for land management (eligible hectare) or size requirements, or because they find the CAP requirements counterproductive for sustainable grazing, participants mentioned seeking other forms of economic support to facilitate their grazing management, such as national funds for nature protection, or private foundations. This was the case, for example, when engaging in ‘rewilding’ activities, where (semi) wild grazers are introduced in nature areas for conservation purposes. Participants in some rewilding areas felt that CAP subsidies would even hinder them from conducting good management and therefore preferred other types of financing:

“Subsidies can lead to the wrong kind of management of nature areas because it is driven by just one species, or one area type (N2000), which is sometimes not appropriate for the area” [...] By not applying for CAP support, we have the freedom to really see what suits the local ecosystem”. (BM_1_LU)

Land-users across all the case studies mentioned the challenges of complying with rules and regulations regarding keeping of animals, especially those that were practising very extensive year-round grazing or wild grazing. These challenges were repeatedly mentioned in interviews, and regarded for example the obligation to ear-tag animals within a few days of their birth, or the obligation to microchip equids.

“The problem is tagging, marking animals. Each calf should be tagged within 7 days of birth. The same goes for animals that lose their earring. To tag selected animals, “passing” the whole herd is necessary. Several people, tractors - to tag on one animal. It would be good if the marking could be done on the occasion of e.g. veterinary procedures and not every time a new calf is born or a cow loses a marker.” (OD_8_LU)

3.4. Social opportunities

3.4.1. Supportive social environment

Social parameters were often mentioned as a factor affecting land-users’ grazing management. Family systems, but also relationships with neighbours and local associations contribute to the maintenance of practices. However when this supportive social environment is lacking, grazing practices associated with them decline. In several of the areas where interviews were conducted, tradition and heritage clearly remain strong drivers of behaviour. For example, in Galicia, semi-wild pony grazing and extensive cattle systems are part of very old traditions and, accordingly, participants emphasised that they were not doing it for financial incentives, but because of their passion, or because they had a strong sense of belonging and pride in the cultural heritage:

“The main reason for the maintenance of this system is that people related with it love the ponies, they ‘have a fever’, and this tradition runs very deeply in their hearts”. (GA_5_LU)

They also highlighted the importance of collaboration with peers and especially collaboration in the family group. This aspect was especially present in Galicia where much of the land is managed through a system of commons. This type of management is rooted in a specific culture that shapes the upbringing and socialization of younger generations. Several

family members often share knowledge, stories and practices about grazing management. This was the case both in Galicia and in the Rhodopes Mountains, for example:

“My grandfather worked all his life as a shepherd. He told me stories how once they slept in the forest and the jackals ate his shoes – they were from leather and in the night the jackals take and ate them. Now my son is involved in this and he continues the tradition and I hope that my grandchildren will also continue the tradition.” (RM_2_LU)

Cultural and family traditions related to animal-rearing were found to be particularly present in our case-studies in Southern and Eastern Europe, which strongly influence management practices. However, engagement in grazing management is slowing-down and participants are witnessing increasing rural exodus and depopulation of traditional agricultural areas. One reason was that these traditional extensive systems are often not economically profitable, and young generations may be forced to seek work in other sectors, or geographical areas. Abandonment of traditionally managed rural landscapes seemed unavoidable, according to the participants, and they believed this phenomenon was going to continue due to the younger generations’ lack of interest of younger generations for these kinds of activities. This was especially the case in the case studies in Southern and Eastern Europe.

“It is [a] family tradition, I have worked with animals since I was a child, and I have a desire to work with animals. My grandparents were livestock breeders, but my uncle and I started not too long ago. If there is no possibility to breed animals we have to leave [the] area, to search for work abroad” (RM_3_LU)

Local networks and associations can contribute to providing land-users with a supportive social environment and therefore social opportunities. For example, associations promoting rare local breeds or support for direct sales of products to consumers. The lack of these opportunities was also mentioned by several land-users wishing there would be more opportunities to sell their products from sustainable grazing, for example in the Oder Delta:

“Maybe it would make sense to create a subsidy also for farm shops. Why not create an additional subsidy per ha or per animal, if a farmer has a farm shop? This would be great, because farm shops are difficult for a farmer, due to the running costs of the job in the farm shop! But subsidies which could finance a job in a farm shop for at least two years would be great! And then suddenly many organic farms would dare to create farm shops! And suddenly we would have a network of direct marketing of organic products here in the region!” (OD_5_LU)

3.4.2. Land-use conflict and human-wildlife co-existence

Participants recurrently mentioned that challenges arise from tensions with neighbouring land-users, such as pollution due to nearby intensive farming, which influences their own land management. Some felt their efforts to manage their land sustainably were in vain in light of neighbouring land-uses impacting upon their activities. For example, this was the case when conducting organic farming or semi-wild grazing next to conventional farms:

“There should be more control over the surrounding farms, especially regarding the use of herbicides, fungicides and pesticides. When you farm organically, but the nearby farms pollute the environment, then it negatively affects your motivation”. (LI_2_LU)

Tensions around land-use are even more pronounced in systems of commons, where semi-wild animals co-exist with other types of land management, due to land-uses which do not allow the presence of freely-roaming semi-wild grazing animals:

“There are conflicts between semi-wild pony grazing and land-owners (Common Lands) who dedicate the land to afforestation leaving the ponies without good grazing areas. The problem is worse in the case of

eucalyptus, which dries-out the land. The commoners also fence-off some areas where pines are regenerating and don't allow ponies and cattle to use that land". (GA_7_LU)

3.5. Motivation

3.5.1. Reflective motivation

In all areas, and especially for participants who conduct grazing management for the primary goal of nature conservation, reflective motivation was one of the main drivers of behaviour in respect of their management. The intrinsic care for nature, and the will to perpetuate a management deemed 'good' for ecosystem services such as promoting habitat for biodiversity or cultural ecosystem services – sometimes despite financial challenges – reportedly drives many land-users, especially those practising semi-wild grazing:

"Highest motivator would be environmental reasons. If it was up to me, there would only be organic farming in the whole of Lithuania. Herbicides or pesticides should not be used at all (...). We have always chosen this pathway because we like nature and natural production". (LI_2_LU)

Indeed, in rewilding projects, the main priority is often the ecosystem services provided by specific large herbivores. Our interviews also indicated that land-users were often torn between their motivation to take care of nature, and the sometimes conflicting need to be economically sustainable.

3.5.2. Automatic motivation

For many land-users, the motivation to engage in certain management not only stems from reflective thought processes, but also from habits, and the automatic motivation of doing what they have done previously, or what has always been done around them. They felt driven to do what they are doing because they have always done it, often because their family used to do it. Often the choice was simply to sustain a certain type of management to maintain a heritage and a family tradition, especially for land-users in the Southern and Eastern Europe that practised extensive grazing:

"I have had horses all my life... I remember all my past generations with horses, my grandfather, my great-grandfather, my great-great-grandfather, everyone". (GA_5_LU)

Motivation as a factor was particularly frequently mentioned by land-users who practise rewilding with semi-wild grazers, or some traditional very extensive management which is not necessarily economically sustainable, but anchored in a long family or community tradition.

4. Discussion of findings

4.1. Key findings

Participants' responses often mentioned physical and social opportunity, with a mix of contextual factors affecting their land management behaviour. Contextual factors, including access to resources such as water for the animals, remoteness or conflicts with other land-uses in the area virtually dictate what land-users can do. The broader socioeconomic context, including a supportive social and policy environment, is also important (Dessart et al., 2019; Läßle and Kelley, 2015). The most frequently-mentioned driver among our participants was the policy map of opportunities and challenges, with the EU's CAP being one of the most dominant factors influencing land-users' grazing management. The CAP offers finance to engage in farming, and regulations defining what types of farming and management can be supported (and by which instrument). However, the CAP also comes along with a range of limitations. Land-users in our study perceived the CAP as containing out-of-touch requirements, an excessive administrative burden and sanctions, as

well as disproportionately greater financial support for less sustainable management, thus generating what they deemed as unfair/difficult competition with unsustainable farming systems. These findings join a host of scholarship on the disciplinary effects of 'Europeanisation' on policy and practice (Clark and Jones, 2009). In this critical perspective, Europeanisation provides not only benefits, but also it enrol citizens of member states in involuntary forms of rationalisation and bureaucratisation that may hinder rather than enable progress. It is thus essential to find a better balance between voluntary and non-voluntary approaches, to reduce burdens, and enhance the benefits from participating in relevant measures (Pe'er et al., 2022).

As regards physical and psychological capabilities, knowledge was found to be a critical driver of land-users' behaviour. This is in agreement with previous studies looking at motivation and behaviour-change in farmers (Macgregor and Warren, 2006; Llewellyn, 2007). To this end, achieving a balance in knowledge between that of the scientific perspectives of veterinary inspectors on the one hand, and an experience-based lay assessment on the other hand, remained a challenge. This tension is currently manifested across a growing range of farming, biosecurity and livestock contexts, in which civilians and lay persons report a buttressing of veterinary authority vis-a-vis other forms of knowledge in a process termed 'veterinarization' (Broz et al., 2021).

We found that particularly the lack of a qualified workforce, understood as physically strong, and people willing to take-over traditional animal-rearing practices, hinder the continuation of such activities (Ustaoglu, Collier, 2018). This is often exacerbated by the continuing trend whereby young generations do not share the traditional values of their parents, and do not want to continue extensive grazing practices that have persisted for multiple generations (Duesberg et al., 2017; Leonard et al., 2017). Among the land-users we interviewed, many indicated an inherent sense of duty to perform what they perceived as good management for nature, while also being driven to perpetuate the traditional management which had been conducted by their family. The fact that the younger generations do not share this duty was lamented by some. Land abandonment and severing ties with generational agriculture is a global trend (Leal Filho et al., 2017) but recent research also indicates that new pathways for (re)joining this way of life may be afoot, including radical ruralisms around agro-food initiatives that appeal to 'back-to-the-land' sentiments and aesthetics (Wilbur, 2013). It is difficult to say exactly how this new demographic assimilates or breaks with farming norms akin to those reported in this study. There is reason to believe, however, that we may see both a differentiation of farmers into communities of practice that position themselves on the basis of different approaches to e.g. grazing and farming generally, and a slower melting pot of values and norms. The role of farmer communities of practice on decision-making has been found by recent research to be considerable (O'Kane et al., 2008).

Outside of these soft norms and values, a common and inescapable challenge for many land-users is of a financial nature (Kabii and Horwitz, 2006), as engagement in extensive grazing offers a lower income compared to more intensive practices. This makes such practices less competitive, or potentially even economically unviable, unless supported by subsidies, such as from the CAP. These challenges highlight the trade-off between what is ecologically and/or culturally valuable, and what is economically viable and, accordingly, the challenge of reaching sustainability in the broader sense, i.e. economic, social and environmental sustainability. Moreover, it highlights the trade-off among these dimensions, but also points at some solutions, such as the enhancement of public acceptance and economical support by means of increased subsidies, for example, of traditional practices as cultural assets.

4.2. Intervention functions and associated policies to support sustainable grazing

One of the benefits of the BCW is the ability to link factors that

influence human behaviour to intervention functions and supportive policies, in order to design effective and targeted behaviour change interventions. Using the BCW model (Michie et al., 2011; Fig. 3), we can identify a wide range of possible interventions that would influence land-users' behaviours. The links between all COM-B aspects and the different types of intervention functions, as well as the links between the intervention functions and policy categories are identified from the authors of the BCW (Michie et al., 2011, 2014) (Supplementary Table 3). In this way, the BCW helps to make a systematic selection of the intervention functions and policy categories most effective at changing the determinants of behaviour. For example, physical and social opportunity was the most frequently COM-B aspect from our participants' responses, using the BCW, the linked interventions functions are: enablement, environmental restructuring and restrictions.

In our study, environmental restructuring intervention functions would include both changing the physical environmental context to favour sustainable practices - e.g., land management interventions, which aim at preserving, or restoring, grazing lands (Sutherland et al., 2019) - as well as interventions that change the social context for sustainable grazing management. Environmental restructuring interventions help to address the context in which decisions are made (Whitmarsh et al., 2021). For example, Byerly et al., (2018) found that interventions to change the social context (e.g. agricultural extension agent of the same gender as the farmer; showing a conservation practice is socially desirable among peers) increased farmers's sustainable land management behaviours. Nudging land-users into conducting sustainable practices can alter behaviours without forbidding any options and without significant changes in economic incentives (Byerly et al., 2018). In our case studies this could be through networking with other land-users for knowledge sharing (Mills et al., 2017).

Enablement interventions are about increasing means or reducing barriers to increase capability (beyond education and training) or opportunity (beyond environmental restructuring) (Michie et al., 2011). In the context of health behaviours, enablement interventions include things like behavioural support to stop smoking or access to surgery to reduce obesity (Michie et al., 2011). In nature conservation, enablement interventions could include access to subsidies or loans to encourage the

desired behaviour or create an online platform for social support and assistance with action planning (Marselle et al., 2020).

Restrictions are interventions which use rules to limit unsustainable behaviours. In our case, it could be, for example, restricting the number of animals allowed per hectare, or restricting the access to some veterinary medicine products which have a negative impact on biodiversity (Floate et al., 2005). However, prohibitions need to be implemented in a way that is compatible with land-users' current practices, and be openly discussed with land-users as to their reasoning and implications. The notion of already substantial bureaucracy also coming with a suite of proscriptions is not likely to elicit compliance from land-users who already feel aggrieved.

Conservation ecologists and practitioners often rely on a few behaviour change intervention functions, such as education, incentives, and regulation (Byerly et al., 2018; Cinner et al., 2018) while underusing others (e.g., social norms, situational context) (Amel et al., 2017; Byerly et al., 2018; Cinner et al., 2018). In this way, the BCW helped a) link interventions to their behavioural influences relating to land-use management and b) broaden the interventions options available to addressing encouraging sustainable grazing behaviour.

The BCW also helps to identify the policy options that best support the intervention functions of environmental restructuring, enablement and restriction (Supplementary Table 3) (Michie et al., 2011, 2014). In so doing, we highlight four types of policy options to address these three intervention functions: i) regulation & legislation, ii) fiscal measures, iii) environmental & social planning and iv) service-provision. These four policy options can support the above outlined interventions, in order to help motivated land-users, and to motivate the transition of others, towards sustainable grazing (Supplementary Table 3).

Regulation and legislation can address multiple behavioural intervention functions. From our interviews, two key regulations in particular that could impact upon land-users' practises and encourage more sustainable practises by mitigating challenges to practising sustainable grazing were presented. Firstly, land-users called for, and would benefit from, increased flexibility to the ear-marking (CAP Regulation no. 1760/2000) and micro-chipping obligations. These are difficult to carry-out in extensive grazing schemes, given that semi-wild grazers, especially in

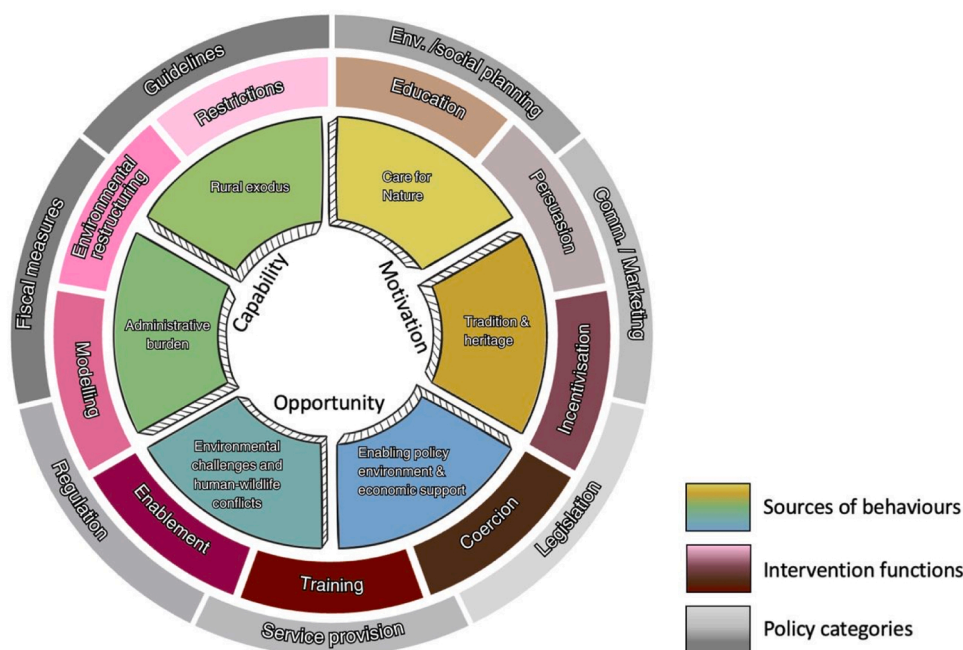


Fig. 3. The Behaviour Change Wheel (BCW) (adapted from Michie et al# 2011) showing, at the core, the capabilities, opportunities, and source of motivation for land-users' behaviour, based on our interviews. The outer layers highlight the way behaviours can be influenced by nine intervention functions, and how these interventions are supported by policy instrument categories (outer part of the wheel), as discussed in 4.1.

less accessible landscapes, are hard to locate, control and mark within the currently applicable strict required timeframe. Second, reducing the regulation burden of sustainable practices such as organic farming could therefore be a way to incentivise sustainable practices and make them less cumbersome (Sahm et al., 2013).

Fiscal measures serve two intervention functions that we have identified to be relevant to our study, namely environmental restructuring and enablement. They contribute to creating a better societal context for good practices among land-users, and provide behavioural support. The CAP was the most frequently-mentioned policy affecting land-users engaged in grazing practices, shaping their type of management top-down. Participants pointed at the value of CAP payments, across various instruments, for maintaining the grazing model that they are implementing, thus demonstrating the necessity and usefulness of financial support. At the same time, participants pointed to a much-needed improvement in coherence of CAP instruments to encourage sustainable grazing management, especially through Agri-Environmental Climate Measures (AECM), Eco-schemes, and payments for Areas facing Nature Constraints, whilst concomitantly reducing support for intensive grazing (in line with the requirement to phase out harmful subsidies). With the latter being economically more competitive, equal support leads to an unequal opportunity favouring intensification (Scown et al., 2020).

On this basis, it would be instructive for decision-makers to enhance investments of Member States in AECM to support sustainable (extensive) grazing systems, as they are effective when well-implemented (Batáry et al., 2015). Member states should maximise their AECM budget and ensure that AECMs are supplemented effectively by Eco-schemes to expand the supported area (and number of supported farmers) to improve habitat quality. It may furthermore be advantageous to maximise the budget for those AECM options that allow greater flexibility in implementation. This would allow motivated land-users to utilise their situated knowledge for selecting optimum management and adaptation to local conditions and changing weather (Reed et al., 2014a, 2014b; Petit et al., 2022). Allowing greater flexibility in implementation could also be facilitated by collaborative frameworks enabling dialogue among stakeholders and land-users, for instance by implementing mechanisms to share territorial challenges among stakeholders who may not typically communicate, aiming to initiate local multi-stakeholder dynamics. Importantly, flexibility permits land-users to also retain a degree of autonomy, according to their knowledge, perceptions and needs (Petit et al., 2022), at a time when outside expert advice or policy may feel clunky in its one-size-fits-all approach. Flexibility is a theme that arguably also extends to the self-reporting by land-owners. A prominent example is the system around compensation for predator attacks, and particularly insufficient access to prevention measures, that has been kept rigid and confusing, and poorly adapted to the local realities of land-users involved in extensive grazing.

Using the BCW we demonstrate a need to broaden the set of interventions to aid the transition to sustainable grazing. This broadening is tightly related also to a broader scope that is needed from a policy perspective, with complementary policy instruments that are necessary beyond the CAP, such as the Nature Restoration Law that may better facilitate improvements in the regulatory, societal and perhaps also budgetary frameworks that are needed to support the transition to sustainable grazing (see Hering et al., 2023). Further policies such as the “framework for Sustainable Food Systems” which the European Commission proposed to release as part of the Green Deal could also further incentivise better grazing practices.

4.3. Sustainable grazing for resilient landscapes

Extensive grazing by large herbivores is, as noted, a hallmark of the rewilding movement. Getting land-users on-board with rewilding and other semi-wild grazing practices, given its frequently contested nature, requires a delicate approach (Lorimer et al., 2015; Perino et al., 2019).

Rewilding must not mean the absence of humans, infrastructure and support as far as grazers are concerned. Land-users have already identified remoteness of resources and water accessibility to support such schemes as obstacles. Hence, in order to facilitate rewilding practices for motivated land-users, both environmental restructuring and enablement are required. In practise, this will involve creating a more active countryside which can support multiple income streams, including income diversification of farms through various practices; expanding market opportunities (especially via direct marketing), and ecotourism practices around wild and semi-wild grazing systems. Ecotourism could additionally contribute to environmental education and public awareness regarding semi-wild grazing systems and the value of rewilding. Land-users particularly expressed a call for greater support to improve their access to markets, for example through direct marketing as an important source of a complementary income where land-users can sell products that stem from extensive- and semi-wild grazing animals, especially with local or unique breeds (Roche et al., 2022). This is especially relevant in areas that have undergone land abandonment. In these areas, expanding or restoring infrastructure for ecotourism, education and product-marketing, as well as anticipating and facilitating conflict resolution around rewilding (Pellis, 2019; Lorimer et al., 2015), are ways forward to reinvigorating the countryside and promoting extensive grazing. For such ecotourism to thrive, grazer species need to be selected for their function in the ecosystem, their robustness, but also their charisma and potential for interesting ecotourism practises.

Finally, environmental restructuring is relevant from a social perspective to improve societal acceptability and support for sustainable grazing both by land-users and other societal actors (e.g. peers, consumers), to generate a more socially and economically-accommodating environment to operate in. For example, some narratives can raise (or recover) the interest among land-users, especially the younger generations, to encourage (re-)adopting such practices. These may include 1) acknowledging that tradition and modernity do not oppose to each other (Petit et al., 2019,2022), 2) communicating societal innovation around rewilding (Ziegler et al., 2022), 3) promoting the work in rugged terrain as means to support one’s sense of strength and self-fulfilment, or 4) focusing on the value of physical and mental wellbeing as co-benefits of such practices (García-Llorente et al., 2016).

Environmental restructuring, as a bottom-up approach, also involves the physical protection and restoration of landscape features (Pe’er et al., 2022). This is especially important in systems which rely on commons. Adopting a landscape design approach may allow a better understanding and planning of ecosystem services-provision from grazing systems. Examples of ecosystem services that may benefit from landscape-scale planning are wildfire mitigation (Rouet-Leduc et al., 2021), enhancing habitat connectivity, and generating a larger-scale green infrastructure to secure habitat provision for macro-fauna, which requires both sufficient habitats and connectivity between them (Perino et al., 2019). Moreover, collaboration between different land-users can improve not only ecological conditions, but also social cohesion and engagement in good practices (Westerink et al., 2017). We note that ideas of building from the ground-up to shape the sorts of landscape practices and species distributions one desires, is an established approach in the countryside all across Europe (Hell, 1996).

4.4. Limitations

This study provided important insights into the factors that influence land-users in their grazing management in very contrasting parts of Europe. However, we also acknowledge some limitations. Firstly, due to the set-up of the project, which was highly transdisciplinary, we had to adapt to the conditions of the project that aimed at providing policy recommendations through policy reports (Pe’er et al., 2021) – this led to the fact that the set-up for the interview was predefined by the project itself. Additionally, due to the purposive sampling techniques employed, the factors of behaviours identified concern primarily land-users

conducting extensive and semi-wild grazing. Hence, we focused our study on why these land-users chose to work on extensive or semi-wild grazing, and on which challenges they experienced. We could, however, not study the motivations of land-users practising other (more intensive) forms of grazing management. Future studies could usefully investigate the challenges of land-users who do not engage in sustainable grazing, to further assess barriers and facilitators of transformation. In this study we did not delve into analysing the specific backgrounds of the interviewees, such as age, socioeconomic background or career paths. Further studies may benefit from exposing how individuality and the diversity in backgrounds shape land-users' perceptions and decisions. This may help in identification of the most appropriate strategies and instruments to foster a transition to sustainable grazing. As the project's goal was to identify the factors influencing land-users in their grazing practices, many behaviour change frameworks could have been used. We used the BCW framework afterwards to organise and analyse our results in the best way, because it is an integrative model of behaviour change that addresses the gaps found in different behaviour change 19 frameworks by including both individual and structural factors that influence behaviour into the COM-B and highlighting the full range of interventions ('downstream' and 'upstream') available to address these factors (Whitmarsh et al., 2021; Michie et al., 2011; Michie et al., 2014; Michie and West, 2013). Moreover, having access to land-users from multiple areas in Europe provided interesting insights, even though the need to conduct interviews in local languages, and then translate them, did present some limitations in translating the nuances of these different interviews. Due to the practical limitations of the project, the interviews were translated by the local partners of the project that conducted the interview, having a professional translator could have resulted in a more rigorous translation. Having the translation from local partners had the advantage of providing understanding and nuance to some of the local cultural context where the interviews were conducted.

5. Conclusions and outlook

Transitions to, and continuation of, sustainable extensive grazing practices depend on the capability, opportunity and motivations of land-users. In this study, we leveraged the BCW to deconstruct such capabilities and motivation among land-users across Europe. We situated our study in the policy context of the EU's CAP, the cultural context of a rural exodus, and in an analytical context that understood land-users as responsive to both top-down and bottom-up approaches to promote extensive grazing. At the same time, our BCW illustrated that land-users are also part of social networks in the countryside which share norms and perceptions about labour, human-animal relationships, and opinions on the place of veterinary expertise. Through our interviews across eight case-study sites, our study was able to provide a broad, yet systematic, overview of the motivational landscape of present-day land-users. As part of this, we identified challenges that were similar across different areas, such as the difficulty related to controlling animals, administrative burdens, or accommodating veterinary rules imposed by outside experts. In contrast, we identified some regional characteristics, for example, challenges linked to the rural depopulation and land abandonment were especially prevalent in Southern and Eastern Europe, while it was not the case in Northern Europe. With drivers of behaviours being highly context-specific, it would be relevant to enrich this study with even more case-studies from different places in Europe. Our findings also allowed us to identify the most relevant intervention functions for facilitating sustainable practices, as well as policy types. Using the Behaviour Change Wheel helped us to identify relevant intervention functions and policy categories, and it is clear that, when it comes to facilitating sustainable grazing practices, it is important to combine different intervention functions and types of policies in order to influence the different sources of behaviour.

Data accessibility statement

As per our agreement with the University of Leipzig Ethics office, and due to the confidentiality of the data, we are unable to make it publicly available.

CRediT authorship contribution statement

Guy Pe'er: Writing – review & editing, Writing – original draft, Supervision, Methodology, Funding acquisition, Formal analysis, Conceptualization. **Erica von Essen:** Writing – review & editing, Writing – original draft, Methodology. **Melissa Marselle:** Writing – review & editing, Writing – original draft, Supervision, Methodology. **Julia Rouet-Leduc:** Writing – review & editing, Writing – original draft, Methodology, Formal analysis, Conceptualization. **Fons van der Plas:** Writing – review & editing, Writing – original draft, Supervision, Methodology, Formal analysis, Conceptualization. **Wouter Helmer:** Resources, Project administration, Funding acquisition, Conceptualization. **Aletta Bonn:** Supervision.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

The data that has been used is confidential.

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Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at [doi:10.1016/j.landusepol.2024.107146](https://doi.org/10.1016/j.landusepol.2024.107146).

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